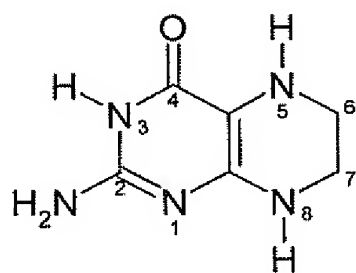


The listing of claims will replace all prior versions, and listings, of claims in the application:

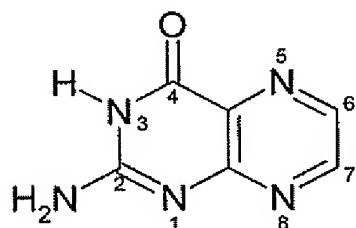
Listing of Claims:

1. (Currently Amended) A process for preparing tetrahydropterin of the following formula



or a tetrahydropterin compound of said tetrahydropterin that is substituted at the 6-, or 7- or 6- and 7- position or positions,

comprising hydrogenating pterin of the following formula



or a pterin compound of said pterin that is monosubstituted at the 6-, or 7- or 6- and 7- position or positions,

with hydrogen in a polar reaction medium in the presence of a hydrogenation catalyst that is a metal complex that is soluble in the reaction medium, wherein the catalyst contains a ligand which is (i) triarylphosphine, (ii) tetramethylene phenylphosphine (iii) pentamethylene phenylphosphine, or (iv) a bidentate ligand with a tertiary amine group and a phosphine group or with two tertiary phosphine ~~diphosphine~~ groups as complexing groups, wherein the bidentate ligands form together with a metal atom a five- to ten membered ring.

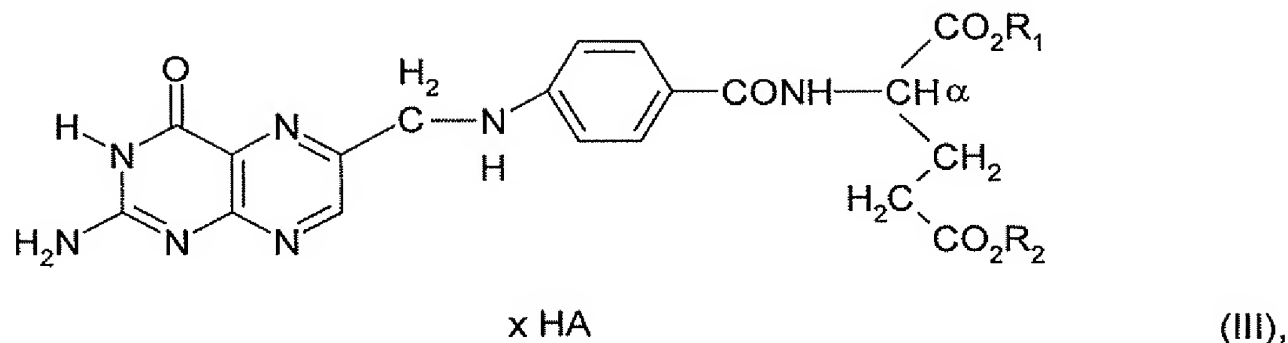
2. (Previously Presented) A process according to claim 1, wherein the polar reaction medium is an aqueous or alcoholic reaction medium.

3. (Previously Presented) A process according to claim 1, wherein the pterin compound is folic acid, a folic acid salt, a folic acid ester, a folic acid ester salt or a dihydro form thereof, with the proviso that in the event of using folic acid, a carboxylic acid thereof or a dihydro form thereof, the reaction medium is aqueous, and in the event of using a folic acid ester, a folic acid ester salt or a dihydro form thereof, the reaction medium is an alcohol.

4. (Previously Presented) A process according to claim 1, wherein the metal complex contains a chiral ligand.

5. (Previously Presented) A process according to claim 3, wherein the metal complex contains a chiral ligand.

6. (Previously Presented) A process according to claim 5, wherein the folic acid ester salt is of formula III and is in the form of a single enantiomer or a mixture of enantiomers of formula III,



in which

one of R_1 or R_2 is H, and the other one of R_1 or R_2 is a monovalent hydrocarbon radical or a hydrocarbon radical attached via a carbon atom in which one or more carbon atoms are each independently replaced by oxygen, sulfur, NH, -N=, or -N(C₁-C₄ Alkyl)-, or both R_1 and R_2 independently of one another represent a monovalent hydrocarbon radical or a hydrocarbon radical attached via a carbon atom in which one or more carbon atoms are each independently replaced by oxygen, sulfur, NH, -N=, or -N(C₁-C₄ Alkyl)-, HA stands for a monobasic to tribasic inorganic or organic acid, and x denotes an integer from 1 to 6 or a fractional number between 0 and 6.

7. (Previously Presented) A process according to claim 6, wherein HA is unsubstituted or substituted phenylsulphonic acid.

8. (Previously Presented) A process according to claim 1, wherein said process is carried out at a hydrogen pressure of 1 to 500 bars.

9. (Previously Presented) A process according to claim 1, wherein said process is carried out at a temperature is 0 to 150⁰ C.

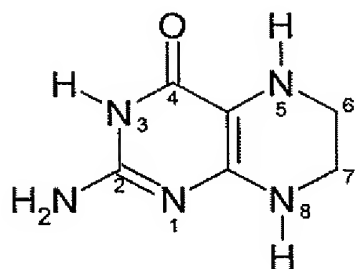
10. (Previously Presented) A process according to claim 1, wherein the molar ratio of pterin or pterin compound to catalyst is 10 to 100,000.

11. (Previously Presented) A process according to claim 1, wherein the reaction medium is water or water in admixture with an organic solvent.

12. (Previously Presented) A process according to claim 2, wherein the alcoholic reaction medium is an alcohol, or an alcohol in admixture with an organic solvent.

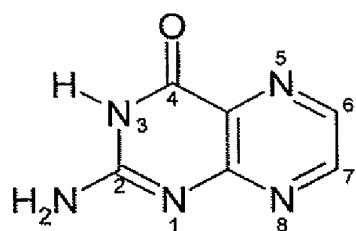
13. (Previously Presented) A process according to claim 1, wherein the metal complex contains a d-8 metal.

14. (Currently Amended) A process for preparing tetrahydropterin of the following formula



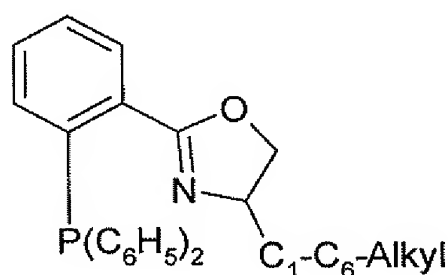
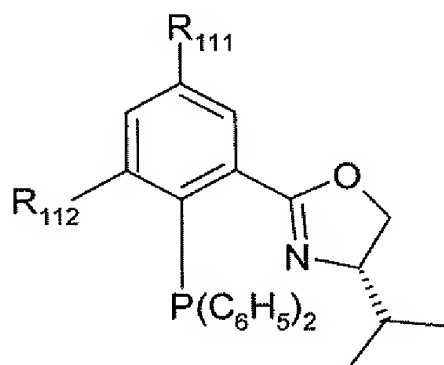
or a tetrahydropterin compound of said tetrahydropterin that is substituted at the 6-, or 7- or 6- and 7- position or positions,

comprising hydrogenating pterin of the following formula



or a pterin compound of said pterin that is monosubstituted at the 6-, or 7- or 6- and 7- position or positions,

with hydrogen in a polar reaction medium in the presence of a hydrogenation catalyst that is a metal complex that is soluble in the reaction medium, wherein the catalyst has a ligand that is an achiral or chiral ~~ditertiary~~ diphosphine, having tertiary phosphine groups which contain two identical or different, unsubstituted or substituted, hydrocarbon radicals with 1 to 20 carbon atoms or a compound of the following formulae



wherein R₁₁₁ and R₁₁₂ are each independently H or methyl.

15. (Currently Amended) A process according to claim 14, wherein the reaction medium is an alcoholic reaction medium, and wherein in the diphosphine ~~ditertiary diphosphines~~

the phosphine groups are attached (a) to various carbon atoms of a hydrocarbon chain having 2 to 4 carbon atoms, or (b) directly or via a bridging group $-CR_aR_b-$ in the ortho positions of a cyclopentadienyl ring or to a cyclopentadienyl ring of a ferrocenyl, wherein R_a and R_b are the same or different and stand for H, C_1 - C_8 alkyl, C_1 - C_4 fluoroalkyl, C_5 - C_6 cycloalkyl, phenyl, benzyl, or phenyl or benzyl substituted with 1 to 3 C_1 - C_4 alkyl or C_1 - C_4 alkoxy.

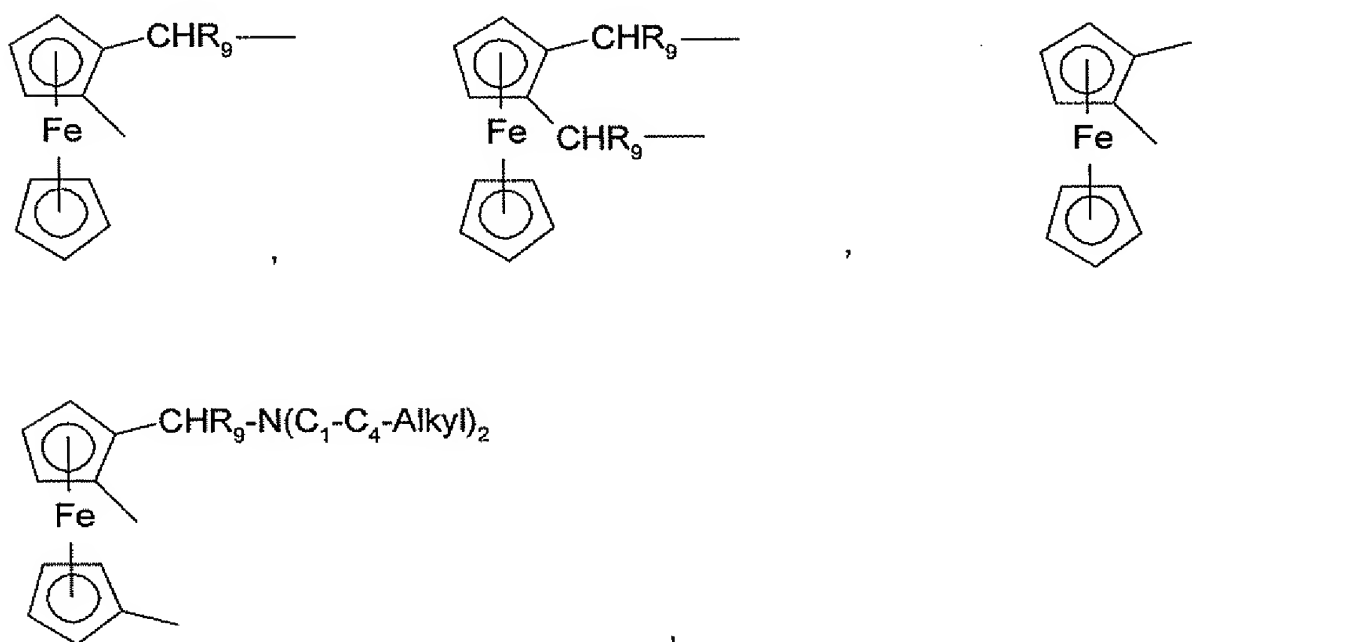
16. (Previously Presented) A process according to claim 14, wherein the reaction medium is an alcoholic reaction medium, and the diphosphine is of formula IV,

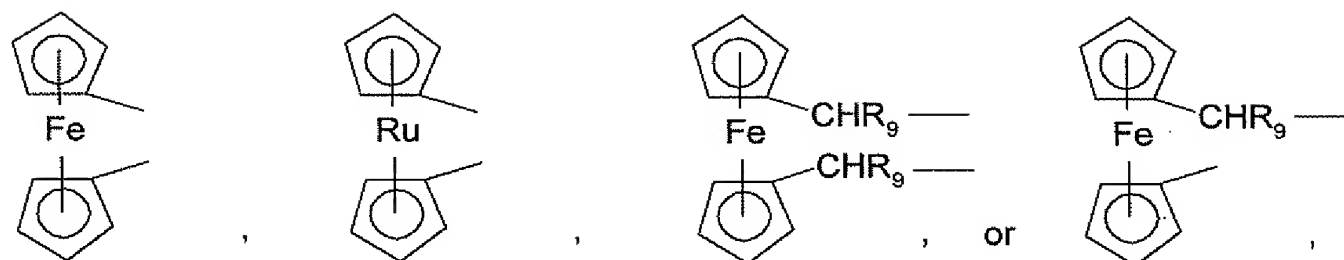


in which

R_4 , R_5 , R_7 and R_8 independently of one another represent a hydrocarbon radical with 1 to 20 carbon atoms, which is unsubstituted or substituted with halogen, C_1 - C_6 alkyl, C_1 - C_6 haloalkyl, C_1 - C_6 alkoxy, C_1 - C_6 haloalkoxy, $(C_6H_5)_3Si$, $(C_1-C_{12} \text{ alkyl})_3Si$, $-NH_2$, $-NH(C_1-C_{12} \text{ alkyl})$, $-NH(\text{phenyl})$, $-NH(\text{benzyl})$, $-N(C_1-C_{12} \text{ alkyl})_2$, $-N(\text{phenyl})_2$, $-N(\text{benzyl})_2$, morpholinyl, piperidinyl, pyrrolidinyl, piperazinyl, -ammonium- X_3^- , $-SO_3M_1$, $-CO_2M_1$, $-PO_3M_1$, or $-CO_2-C_1-C_6 \text{ alkyl}$, in which M_1 represents an alkali metal or hydrogen and X_3^- is the anion of a monobasic acid; or R_4 and R_5 , and/or R_7 and R_8 together denote tetramethylene, pentmethylenes, or 3-oxapentane-1,5-diyl, which is unsubstituted or substituted with halogen, C_1 - C_6 alkyl or C_1 - C_6 alkoxy; and R_6 is C_2 - C_4 alkylene, which is unsubstituted or substituted with C_1 - C_6 alkyl, C_1 - C_6 alkoxy, C_5 or C_6 cycloalkyl, phenyl, naphthyl, or benzyl; 1,2 or 1,3-cycloalkylene, 1,2- or 1,3-cycloalkenylenes, 1,2- or 1,3-bicycloalkylene or 1,2- or 1,3-bicycloalkenylenes with 4 to 10

carbon atoms, which is unsubstituted or substituted with C₁-C₆ alkyl, phenyl, or benzyl; 1,2- or 1,3-cycloalkylene, 1,2- or 1,3-cycloalkylene, 1,2- or 1,3-bicycloalkylene or 1,2- or 1,3-bicycloalkylene with 4 to 10 carbon atoms, which is unsubstituted or substituted with C₁-C₆ alkyl, phenyl, or benzyl, at whose 1 and/or 2 positions or at whose 3-position methylene or C₂-C₄ alkylidene is attached; 1,4-butylene substituted in the 2,3 positions with R₉R₁₀C(O-)₂, and which in the 1 and/or 4 positions is unsubstituted or substituted with C₁-C₆ alkyl, phenyl, or benzyl, and where R₉ and R₁₀ independently of one another represent hydrogen, C₁-C₆ alkyl, phenyl or benzyl; 3,4- or 2,4-pyrrolidinylenes or methylene-4-pyrrolidine-4-yl whose nitrogen atom is substituted with hydrogen, C₁-C₁₂ alkyl, phenyl, benzyl, C₁-C₁₂ alkoxy, C₁-C₈ acyl, C₁-C₁₂ alkylaminocarbonyl; or denotes 1,2-phenylene, 2-benzylene, 1,2-xylylene, 1,8-naphthylene, 2,2'-dinaphthylene or 2,2'-diphenylene, which is unsubstituted or substituted with halogen, -OH, C₁-C₆ alkyl, C₁-C₆ alkoxy, phenyl, benzyl, phenoxy or benzyloxy; or R₆ stands for a radical of the formulas





in which R_9 denotes hydrogen, C_1 - C_8 alkyl, C_1 - C_4 fluoroalkyl, unsubstituted phenyl or phenyl substituted with 1 to 3 F, Cl, Br, C_1 - C_4 alkyl, C_1 - C_4 alkoxy or fluoromethyl.

17. (Previously Presented) A process according to claim 14, wherein the reaction medium is an aqueous reaction medium, and the diphosphine contains one or more water-solubilising polar substituents, which are attached either directly or via a bridging group to substituents of the phosphine group, wherein the bridging group is of formula

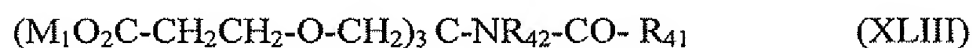


wherein

X_5 is a direct bond, O, NH, $Si(CH_3)_2$, $N(C_1-C_4\text{-alkyl})$, NH-CO, $N(C_1-C_4\text{-alkyl})CO$, CO-NH, $CON(C_1-C_4\text{-alkyl})$, NH-CO-O, $N(C_1-C_4\text{-alkyl})CO-O$, O-CO-NH, O- $CON(C_1-C_4\text{-alkyl})$, NH-CO-NH, $N(C_1-C_4\text{-alkyl})CO-NH$ or $N(C_1-C_4\text{-alkyl})CO-N(C_1-C_4\text{-alkyl})$, and

R_{41} is a divalent hydrocarbon radical with 1 to 40 carbon atoms.

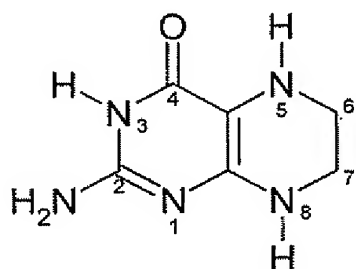
18. (Currently Amended) A process according to claim 14, wherein the reaction medium is an aqueous reaction medium, and the diphosphine is of formula XLIII,



in which M_1 stands for H, an alkali metal cation or an ammonium cation, R_{42} denotes

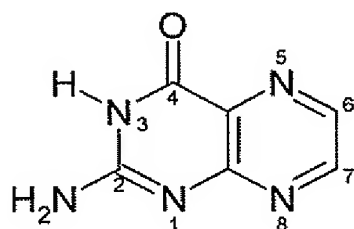
C₁-C₄ alkyl or H, and R₄₁ is a monovalent radical of a chiral ditertiary diphosphine, having tertiary phosphine groups which contain two identical or different, unsubstituted or substituted, hydrocarbon radicals with 1 to 20 carbon atoms, with the CO group being attached directly direct to a carbon or nitrogen atom of the monovalent radical, or to an oxygen or nitrogen atom or to a carbon atom of a bridging group of the monovalent radical R₄₁.

19. (Currently Amended) A process for preparing tetrahydropterin of the following formula



or a tetrahydropterin compound of said tetrahydropterin that is substituted at the 6-, or 7- or 6- and 7- position or positions,

comprising hydrogenating pterin of the following formula



or a pterin compound of said pterin that is monosubstituted at the 6-, or 7- or 6- and 7- position or positions,

with hydrogen in a polar reaction medium in the presence of a hydrogenation catalyst that is a metal complex that is soluble in the reaction medium of formula XLIV, XLIVa or XLIVb,



in which

Y stands for monoolefin ligands or a diene ligand;

X_7 represents an achiral or chiral ~~ditertiary~~ diphosphine, having tertiary phosphine groups which contain two identical or different, unsubstituted or substituted, hydrocarbon radicals with 1 to 20 carbon atoms, that forms a 5 to 7 membered ring with the metal atom Me_2 or Ru;

Me_2 denotes Ir(I) or Rh(I);

Z represents $-Cl$, $-Br$, or $-I$; and

A_2 is an anion of an oxy-acid, BF_4^- , $B(Phenyl)_4^-$, PF_6^- , $SbCl_6^-$, AsF_6^- or SbF_6^- ;

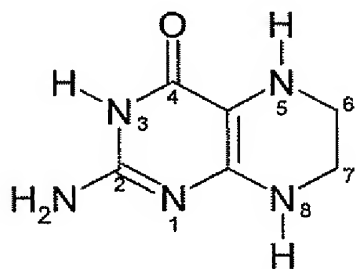
X_8 and X_9 are the same or different and have the meaning of Z or A_2 , or X_8 has the meaning of Z or A_2 and X_9 stands for hydride.

20-28. (Cancelled)

29. (Previously Presented)

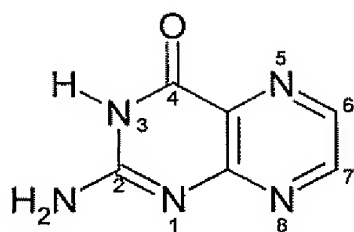
A process for preparing tetrahydropterin of

the following formula



or a tetrahydropterin compound of said tetrahydropterin that is substituted at the 6-, or 7- or 6- and 7- position or positions,

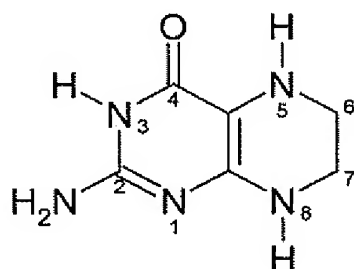
comprising hydrogenating pterin of the following formula



or a pterin compound of said pterin that is monosubstituted at the 6-, or 7- or 6- and 7- position or positions,

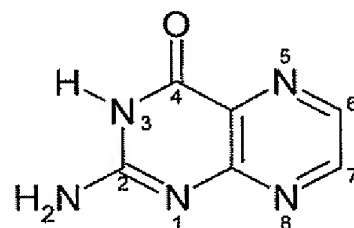
with hydrogen in alcohol or in alcohol in admixture with an organic solvent in the presence of a hydrogenation catalyst that is a metal complex that is soluble in the reaction medium.

30. (Currently Amended) A process for preparing tetrahydropterin of the following formula



or a tetrahydropterin compound of said tetrahydropterin that is substituted at the 6-, or 7- or 6- and 7- position or positions,

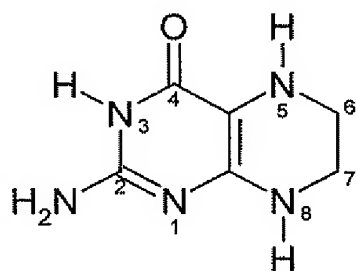
comprising hydrogenating pterin of the following formula



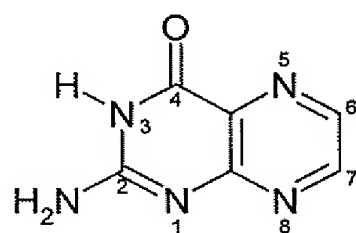
or a pterin compound of said pterin that is monosubstituted at the 6-, or 7- or 6- and 7- position or positions,

with hydrogen in a polar reaction medium in the presence of a hydrogenation catalyst that is a metal complex that is and contains an achiral or chiral ditertiary diphosphine, having tertiary phosphine groups which contain two identical or different, unsubstituted or substituted, hydrocarbon radicals with 1 to 20 carbon atoms.

31. (Previously Presented) A process for preparing tetrahydropterin of the following formula



or a tetrahydropterin compound of said tetrahydropterin that is substituted at the 6-, or 7- or 6- and 7- position or positions,
comprising hydrogenating pterin of the following formula



or a pterin compound of said pterin that is monosubstituted at the 6-, or 7- or 6- and 7- position or positions,

with hydrogen in an alcoholic reaction medium in the presence of a hydrogenation catalyst-that is a metal complex that is soluble in the reaction medium and contains an achiral or chiral ditertiary diphosphine that is attached (a) to various carbon atoms of a hydrocarbon chain having 2 to 4 carbon atoms, or (b) directly or via a bridging group $-CR_aR_b-$ in the ortho positions of a

cyclopentadienyl ring or to a cyclopentadienyl ring of a ferrocenyl, wherein R_a and R_b are the same or different and stand for H, C_1 - C_8 alkyl, C_1 - C_4 fluoroalkyl, C_5 - C_6 cycloalkyl, phenyl, benzyl, or phenyl or benzyl substituted with 1 to 3 C_1 - C_4 alkyl or C_1 - C_4 alkoxy.

32. (Cancelled)

33. (Previously Presented) A process according to claim 3, wherein the hydrogenation is carried out at elevated pressure.

34. (Previously Presented) A process according to claim 1, wherein the metal complex contains iridium, rhodium or ruthenium.

35 (Previously Presented) A process according to claim 14, wherein the reaction medium is an alcoholic reaction medium, and wherein in the ditertiary diphosphines the phosphine groups are attached (a) to various carbon atoms of a hydrocarbon chain having 2 to 4 carbon atoms, or (b) directly or via a bridging group $-CR_aR_b-$ in the ortho positions of a cyclopentadienyl ring or to a cyclopentadienyl ring of a ferrocenyl, wherein R_a and R_b are the same or different and stand for H, C_1 - C_8 alkyl, C_1 - C_4 fluoroalkyl, C_5 - C_6 cycloalkyl, benzyl, or phenyl.

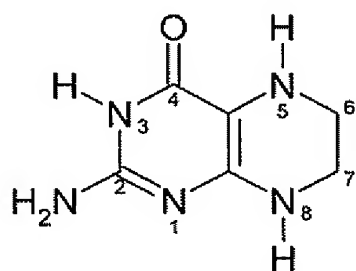
36. (Previously Presented) A process according to claim 18, wherein R_{42} denotes H.

37. (Previously Presented) A process according to claim 31, wherein R_a and R_b are the same or different and stand for H, C_1 - C_8 alkyl, C_1 - C_4 fluoroalkyl, C_5 - C_6 cycloalkyl, benzyl, or phenyl.

38. (Previously Presented) A process according to claim 14, wherein the pterin compound is folic acid, a folic acid salt, a folic acid ester, a folic acid ester salt or a dihydro form thereof, with the proviso that in the event of using folic acid, a carboxylic acid thereof or a dihydro form thereof, the reaction medium is aqueous, and in the event of using a folic acid ester, a folic acid ester salt or a dihydro form thereof, the reaction medium is an alcohol.

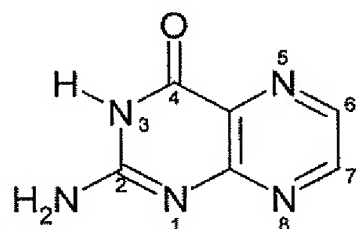
39. (Previously Presented) A process according to claim 19, wherein the pterin compound is folic acid, a folic acid salt, a folic acid ester, a folic acid ester salt or a dihydro form thereof, with the proviso that in the event of using folic acid, a carboxylic acid thereof or a dihydro form thereof, the reaction medium is aqueous, and in the event of using a folic acid ester, a folic acid ester salt or a dihydro form thereof, the reaction medium is an alcohol.

40. (Previously Presented) A process for preparing tetrahydropterin of the following formula



or a tetrahydropterin compound of said tetrahydropterin that is substituted at the 6-, or 7- or 6- and 7- position or positions,

comprising hydrogenating pterin of the following formula



or a pterin compound of said pterin that is monosubstituted at the 6-, or 7- or 6- and 7- position or positions,

with hydrogen in alcohol or in alcohol in admixture with an organic solvent in the presence of a hydrogenation catalyst that is a metal complex that is soluble in the reaction medium, wherein the pterin compound is folic acid, a folic acid salt, a folic acid ester, a folic acid ester salt or a dihydro form thereof, with the proviso that in the event of using folic acid, a carboxylic acid thereof or a dihydro form thereof, the reaction medium is aqueous, and in the event of using a folic acid ester, a folic acid ester salt or a dihydro form thereof, the reaction medium is an alcohol.

41. (Previously Presented) A process according to claim 30, wherein the pterin compound is folic acid, a folic acid salt, a folic acid ester, a folic acid ester salt or a dihydro form thereof, with the proviso that in the event of using folic acid, a carboxylic acid thereof or a dihydro form thereof, the reaction medium is aqueous, and in the event of using a folic acid ester, a folic acid ester salt or a dihydro form thereof, the reaction medium is an alcohol.

42. (Previously Presented) A process according to claim 31, wherein the pterin compound is folic acid, a folic acid salt, a folic acid ester, a folic acid ester salt or a dihydro form thereof, with the proviso that in the event of using folic acid, a carboxylic acid thereof or a

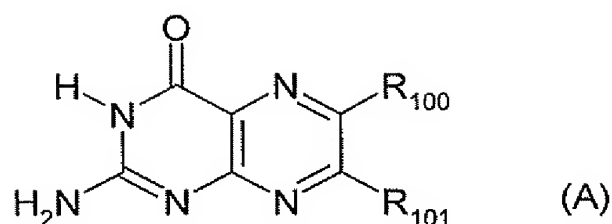
dihydro form thereof, the reaction medium is aqueous, and in the event of using a folic acid ester, a folic acid ester salt or a dihydro form thereof, the reaction medium is an alcohol.

43. (Currently Amended) A process according to claim 6, wherein R_1 and/or R_2 are, each independently, an aliphatic radical with 1-20 carbon atoms, a cycloaliphatic radical with 3-8 carbon atoms, a cycloaliphatic-aliphatic radical with 3-8 cyclic carbon atoms and 1 to 6 carbon atoms in the aliphatic part of the radical, an aromatic hydrocarbon radical with 6-14 carbon atoms, an aromatic-aliphatic radical with 7-15 carbon atoms, a an alkyl radical with 2-16 carbon atoms in which one or more carbon atoms are each independently replaced by oxygen, sulfur, NH, or -N(C₁-C₄ Alkyl)-, a heterocycloaliphatic radical with 3-8 ring links, a heterocycloaliphatic-aliphatic radical with 3-8 ring links and 1 to 6 carbon atoms in the aliphatic part of the radical, a heteroaromatic radical with 4 to 13 carbon atoms, a heteroaromatic-aliphatic radical with 4 to 13 cyclic carbon atoms and 1 to 6 carbon atoms in the aliphatic part of the radical, wherein the hetero part of each group means that the radical contains one or more oxygen, sulfur or nitrogen atoms, wherein heterocycloaliphatic means a cycloaliphatic radical in which one or more carbon atoms are each independently replaced by oxygen, sulfur, NH, or -N=.

44. (Cancelled)

45. (Previously Presented) A process according to claim 1, wherein the pterin compound is a pterin that is substituted in the 6- and/or 7- positions.

46. (Previously Presented) A process according to claim 1, wherein the pterin compound is of formula (A)



in which

R₁₀₁ is H or independently has the meaning of R₁₀₀,

R₁₀₀ is an organic radical attached via a C, O or N atom and having 1 to 50 carbon atoms,

M₁₀₀ is Li, K, Na, NH₄⁺, or ammonium with 1 to 16 carbon atoms,

R₁₀₂ is C₁-C₈-alkyl, C₅- or C₆-cycloalkyl, phenyl or benzyl, and

R₁₀₃ is C₁-C₄-alkyl, phenyl or benzyl.

47. (Previously Presented) A process according to claim 46, wherein R₁₀₀ is not interrupted or is interrupted by one or more of -O-, -NH-, -N(C₁-C₄-alkyl)-, -C(O)-, -C(O)O-, -OC(O)-, -OC(O)O-, -C(O)NH-, -NHC(O)-, -NHC(O)O-, -OC(O)NH-, -NHC(O)NH-, -C(O)N(C₁-C₄-alkyl)-, -N(C₁-C₄-alkyl)C(O)-, -N(C₁-C₄-alkyl)C(O)O-, -OC(O)N(C₁-C₄-alkyl)-, -N(C₁-C₄-alkyl)C(O)N(C₁-C₄-alkyl)-, and which is unsubstituted or is substituted with F, Cl, Br, -CN, -OCN, -NCO, -OH, -NH₂, -NHC₁-C₄-alkyl, -N(C₁-C₄-alkyl)₂, C₁-C₄-alkyl, C₁-C₄-haloalkyl, C₁-C₄-hydroxyalkyl, C₁-C₄-alkoxy, C₁-C₄-haloalkoxy, -C(O)OH, -C(O)OM₁₀₀, -C(O)OC₁-C₄-alkyl, -C(O)NH₂, -C(O)NHC₁-C₄-alkyl, -C(O)N(C₁-C₄-alkyl)₂, R₁₀₂-C(O)O-, R₁₀₂-OC(O)O-, R₁₀₂-C(O)NH-, R₁₀₂-C(O)N(C₁-C₄-alkyl)-, R₁₀₂-NHC(O)NH-, R₁₀₃C(O)- or -CH(O).

48. (Previously Presented) A process according to claim 19, wherein A₂ is ClO₄⁻, CF₃SO₃⁻, CH₃SO₃⁻, HSO₄⁻, BF₄⁻, B(Phenyl)₄⁻, PF₆⁻, SbCl₆⁻, AsF₆⁻ or SbF₆⁻.

49. (Previously Presented) A process according to claim 6, wherein R₁ and/or R₂ are, each independently,

pyrrolidinyl, piperidinyl, morpholinyl, tetrahydropyranyl, piperazinyl, pyrrolidinyl methyl, pyrrolidinyl ethyl, piperidinyl methyl, piperidinyl ethyl, morpholinyl methyl,

morpholinyl ethyl, tetrahydropyranyl methyl, tetrahydropyranyl ethyl, piperazinyl methyl or piperazinyl ethyl.

50. (New) A process according to claim 14, wherein the reaction medium is an aqueous reaction medium, and the diphosphine is of formula XLIII,



in which M_1 stands for H, an alkali metal cation or an ammonium cation, R_{42} denotes C_1 - C_4 alkyl or H, and R_{41} is a monovalent radical of a chiral diphosphine, having tertiary phosphine groups which contain two identical or different, unsubstituted or substituted, hydrocarbon radicals with 1 to 20 carbon atoms, with the CO group being attached directly to a carbon or nitrogen atom of the monovalent radical R_{41} , or to an oxygen or nitrogen atom or to a carbon atom of a bridging group present between the CO group and the monovalent radical R_{41} .